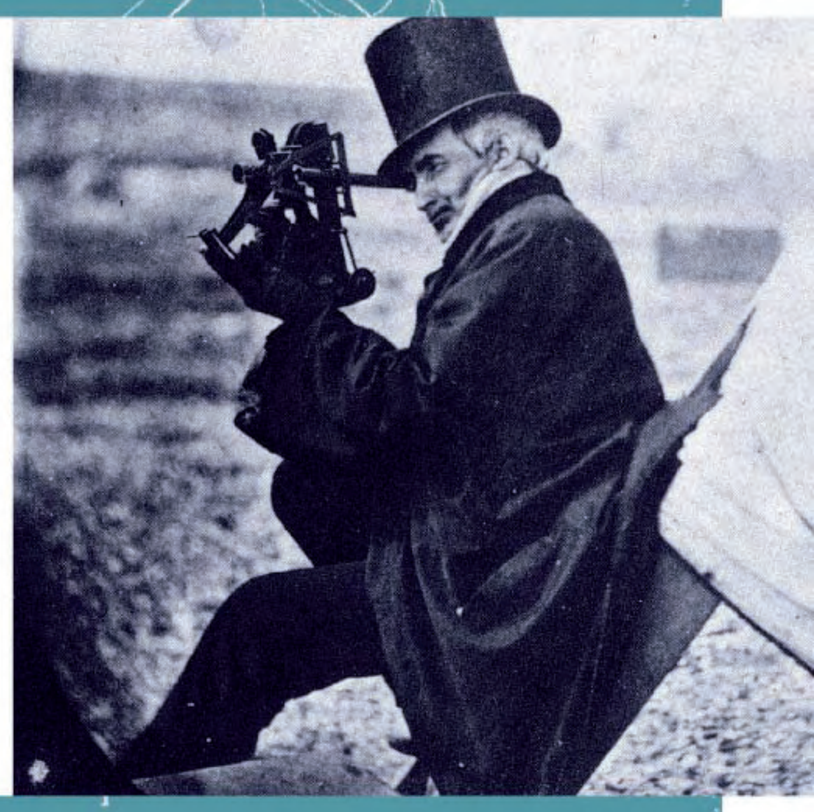
Axel Jansen



Alexander Dallas Bache

Building the American Nation through Science and Education in the Nineteenth Century

campus

Alexander Dallas Bache

Axel Jansen has been invited to teach as a temporary full professor in Heidelberg, Frankfurt, and Kassel, and he has taught in Tübingen and at UCLA. Since 2016 he is the Deputy Director of the German Historical Institute Washington.

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"Axel Jansen's writing is exemplary in its deployment of close readings and literary perspectives to rethink large issues in the history of American science and the American state. His focus on Alexander Dallas Bache, self-conscious descendant of Benjamin Franklin, supports a new understanding of professionalizing campaigns. Bache did not mainly look to the nation to build up science, but labored to harness science to the task of lifting the burden of sectionalism and forming a genuine nation."

—Theodore M. Porter, UCLA

"In this bold reassessment of Alexander Dallas Bache, Jansen employs new theories of professional development to re-conceptualize the relationship between the rise of science and the project of nation-building in the ante-bellum United States. A critical reappraisal of Bache's early career is augmented with close textual analyses of key documents to reveal an institutional realist with a powerful—though previously misconstrued—vision for his nation's future. Jansen's intriguing perspective transforms the founding of the National Academy of Sciences in 1863 from a war-time happenstance of minimal lasting importance into the culmination of a project designed to bond science and the state on special terms. While the Academy itself may never have functioned as Bache hoped it would, the projects that Bache influenced would continue apace. He had laid the groundwork for one kind of tie between science and the state, which would have huge implications and profound lessons for later American history. This challenging new perspective is a must-read for anyone interested in the various roots of modern science and professionalism."

—James C. Mohr, College of Arts and Sciences Professor of History and Philip H. Knight Professor of Social Sciences, University of Oregon

"American historians have long debated the timing of the National Academy's founding without reaching consensus. Now Axel Jansen sets forth a new and insightful analysis that revolves around the extraordinary life and character of Alexander Dallas Bache, the first president of the academy. He and the most prominent scientists of his generation embarked on what Jansen calls "state building," establishing authority and encouraging greater consolidation even in the face of national disintegration. This is a book historians will not fail to read."

—Thomas Haskell, Rice University

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Chapter 1

Introduction

The Curious Case of Alexander Dallas Bache

In the history of American science, Alexander Dallas Bache (1806–1867), great-grandson of Benjamin Franklin, occupies a singular and unparalleled position. More than anyone else in his generation and in perhaps any generation before or since, he embodied the American scientific profession, directed its development, and shaped its institutions. Most major national scientific institutions and organizations between 1830 and 1865 relied on his support or leadership: In the 1830s, Bache was the principal organizer of Philadelphia's Franklin Institute, then the most prominent research organization in the United States. In 1843, he became the superintendent of the U.S. Coast Survey, the country's largest government-run scientific enterprise with more scientific employees than any other contemporary science-related institution including Harvard University. From 1847, Bache helped instigate and direct the American Association for the Advancement of Science (AAAS), the country's first national platform for science. He was one of the regents of the Smithsonian Institution and helped secure the post of secretary (i.e. director) for his colleague Joseph Henry in 1846. Finally, Bache helped found the National Academy of Sciences and became its first president in 1863. In view of this ubiquitous role, A. Hunter Dupree considers him (with physicist Joseph Henry and geologist John Wesley Powell) among the three "great hierarchs of federal science" in the nineteenth century, and Robert V. Bruce has concluded that Bache spoke "more authoritatively for antebellum science than anyone else."[1]

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1 Quotes from Robert V. Bruce, *The Launching of Modern American Science, 1846–1876* (New York: Knopf, 1987), 255, and Nathan Reingold, *Science in Nineteenth-Century America, a Documentary History* (London: Macmillan, 1966), 8, respectively. This assessment dates back to Bache's own time. In his eulogy of Bache, astronomer Benjamin Apthorp Gould

Fig. 1. Alexander Dallas Bache

(From American Philosophical Society, Proceedings 84:2, 1941)

While Bache was the acknowledged leader of mid-nineteenth century American science, however, the authority for his leadership remains enigmatic. One problem is that Bache was less pioneering in his research than in his institutional efforts. In a symposium in honor of Bache's legacy, organized by the American Philosophical Society in 1941, Frank B. Jewett conceded that while Bache's contributions to science "dealt largely with … [scientific problems] of recognized fundamental importance," they nevertheless concerned "departments of physics which neither then nor later

suggested in 1868 that to his colleague, "the scientific progress of the nation is indebted, more than to any other man who has trod her soil." Benjamin Apthorp Gould, "An Address in Commemoration of Alexander Dallas Bache," American Association for the Advancement of Science, *Proceedings* 17 (1868): 35.

could be regarded as spectacular or especially productive."[2] In his more recent assessment, Bruce perhaps overemphasizes this point by arguing that as "a scientist, Bache fell far short of both his famous ancestor [Benjamin Franklin] and his friend Professor [Joseph] Henry."[3] These observations reflect the fact that while Bache plays a prominent role in accounts of the institutional development of American science in the nineteenth century, he is less prominent in accounts of the development of the cognitive content of science in that period.[4] This has left Bache with a somewhat ambivalent reputation. Bache was well connected through relatives in Pennsylvania and in federal politics. Was he not much more than an apt administrator, an institutional booster with good connections and a knack for federal fundraising?

Another aspect of Bache's career complicates matters, and that is his involvement in education before 1842. While historians of American science have focused on his institutional role and his leadership in the professional community, historians of education have focused on Bache's role as president of the Girard College for Orphans and as first principal of Central High School in Philadelphia.[5] In 1836, Bache gave up his professorship at the University of Pennsylvania in order to assume these and other educational activities. How do such efforts fit into the pattern? Was Bache interested in cultural control, a Whiggish interest in "moral and intellectual discipline" both in his educational and in his professional leader-

2 Frank B. Jewett, "Alexander Dallas Bache. A Founder, First President and Benefactor of the National Academy of Sciences," American Philosophical Society, *Proceedings* 84, no. 2 (1941): 181.

3 Bruce, *Launching of Modern American Science*, 17. Similar comments abound. Another example is Mary Ann James, *Elites in Conflict: The Antebellum Clash over the Dudley Observatory* (New Brunswick: Rutgers Univ. Press, 1987), 26.

4 Geodesists of course remember Bache, as attested by the American Philosophical Society's symposium in 1941. *Commemoration of the Life and Work of Alexander Dallas Bache and Symposium on Geomagnetism*, American Philosophical Society, *Proceedings* 84, no. 2 (1941). He is mentioned in Mark Littmann, *The Heavens on Fire: The Great Leonid Meteor Storms* (Cambridge, UK: Cambridge Univ. Press, 1998). My argument here pertains to Bache's research record in relation to his institutional role. For more on this, see chap. 4 below.

5 These include: David F. Labaree, *Making of an American High School* (New Haven: Yale Univ. Press, 1992) and David B. Tyack and Elisabeth Hansot, *Managers of Virtue: Public School Leadership in America, 1820–1980* (New York: Basic Books, 1982).

ship, or was his educational involvement an extension of his administrative interests?[6]

In the absence of a comprehensive biography of Alexander Dallas Bache, and considering his extensive involvement and leadership in mid-nineteenth century American science, any attempt to clarify such issues will provide insights relevant well beyond the immediate task of identifying the motivational coordinates of his career. Bache's singular role in American science is of particular significance when considered in the context of recent developments in theories of the professions.

2. The Revised Theory of Professionalization

Historians have most commonly discussed Bache's career in the context of the emergence of the American scientific community.[7] In his pioneering work on the history of American science, A. Hunter Dupree had focused on the history of science as a development leading to the federal support

6 Hugh R. Slotten, "The Dilemmas of Science in the Unites States. Alexander Dallas Bache and the U.S. Coast Survey," *Isis*, no. 84 (1993): 47. Slotten does not discuss Bache's career overall but focuses on his Coast Survey work. He does use similar ideas for explaining Bache's educational work in his essay on "Science, Education, and Antebellum Reform: The Case of Alexander Dallas Bache," *History of Education Quarterly* 31, no. 3 (Autumn 1991): 323–42. For more on this, see chap. 5.

7 An earlier generation of historians focused on the cognitive content of science. To them, American achievements in the nineteenth century seemed negligible when compared to European science. See, for example, Richard H. Shryock, "American Indifference to Basic Research," *Archives internationales d'histoire des sciences* XXVII (1948): 50–65. See also I. Bernhard Cohen, "Science in America: The 19th Century," in *Paths of American Thought*, ed. Arthur M. Schlesinger Jr. and Morton White (Boston: Houghton Mifflin, 1963); Ronald L. Numbers and Charles E. Rosenberg, eds., "Science in American Society: A Generation of Historical Debate," in *The Scientific Enterprise in America: Readings from Isis* (Chicago: Univ. of Chicago Press, 1996). This focus on the cognitive development of science was modified by Nathan Reingold, "American Indifference to Basic Research: A Reappraisal," in *Nineteenth-Century American Science: A Reappraisal*, ed. George H. Daniels (Evanston: Northwestern Univ. Press, 1972), 38–62, and George H. Daniels, *American Science in the Age of Jackson* (New York: Columbia Univ. Press, 1968). An important book of the early phase, in which the professionalization of the scientific community was discussed, is Sally Kohlstedt, *The Formation of the American Scientific Community: The American Association for the Advancement of Science, 1848–1860* (Urbana: Univ. of Illinois Press, 1976). The most recent overview of the development of American science in the nineteenth century is Bruce, *Launching of Modern American Science.*

of research by the twentieth-century activist state.[8] In the 1970s, historians shifted their emphasis toward explaining the emergence of professional institutions in the United States. George Daniels suggested that the American scientific profession got started between 1820 and 1840 as it moved from gathering facts to developing "esoteric" knowledge, a process that culminated in the public acceptance of science before the Civil War.[9] Sally Kohlstedt's classic work on the *Formation of the American Scientific Community* views the founding of the AAAS in 1848 as a decisive moment. She provides a detailed account of the struggles that led to the organization's founding and of conflicts within the profession.[10] The historiographic focus altered slightly in the 1980s with authors such as Hugh R. Slotten who stressed "boundary work," and that scientists used a particular ethos to facilitate social and cultural control. His work was receptive to views that stressed the role of individual and group interests.[11]

The historical evidence suggested that as a profession, science was somehow distinct from other occupations, and sociological theories seemed to offer the best mode for explaining what it was that scientists were doing and how it was similar to and different from other activities.

In historical writing about the professions, it has proven to be of little benefit to use the term "profession" as one found it at large, because adopting the term from historic sources was to associate it with any occupation claiming professional status.[12] This is why more recent theories have tried to explain the peculiar characteristics of some occupations, such as

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8 A. Hunter Dupree, *Science in the Federal Government: A History of Policies and Activities to 1940* (Baltimore: Johns Hopkins Univ. Press, 1986).

9 George H. Daniels, "The Process of Professionalization in American Science: The Emergent Period, 1820–1860," *Isis* 58, no. 2 (Summer 1967): 150–66. Important literature also includes Nathan Reingold, "Definitions and Speculations: The Professionalization of Science in America in the Nineteenth Century," in *The Pursuit of Knowledge in the Early American Republic: American Learned and Scientific Societies from Colonial Times to the Civil War*, ed. Alexandra Oleson and Sanborn C. Brown (Baltimore: Johns Hopkins Univ. Press, 1976), 33–69.

10 Kohlstedt, *Formation of the American Scientific Community*.

11 Bruce, *Launching of Modern American Science*, 263. Slotten, "Dilemmas of Science," 43; see also his *Patronage, Practice, and the Culture of American Science: Alexander Dallas Bache and the U.S. Coast Survey* (Cambridge: Cambridge Univ. Press, 1994).

12 Burton J. Bledstein, *The Culture of Professionalism: The Middle Class and the Development of Higher Education in America* (New York: W. W. Norton, 1976) uses the term too broadly. Laurence Veysey ("Who's a Professional? Who Cares?," *Reviews in American History* 3 (December 1975): 419–23) has criticized inflationary uses of the term but has also questioned the relevance of trying to define it.

the tendency by professions to invoke autonomy from outside social and political interference and to organize their own affairs. Very broadly speaking, there have been two sociological positions relevant for historians. A structural-functionalist approach (Talcott Parsons, William J. Goode) stressed the profession's role in developing, preserving, and using esoteric knowledge considered to be an important cultural value. One problem with this idea was that it could not explain why the professions successfully insisted on autonomy and how they had averted control by outside experts or administrators. Another approach focused on the profession as an interest group (Terence J. Johnson, Magali Sarfatti Larson). It considered the profession's claims of representing esoteric knowledge as an ideological tool for establishing market control in order to protect pecuniary interests and advantages. Neither of these two theoretical perspectives addressed the issue of whether professions pursue a specific type of activity different from other activities that do not require autonomy and exclusive organization.[13]

In his revised theory of professionalization, Ulrich Oevermann does not restrict "professionalization" to the emergence of organizations or successful claims for autonomy by occupational groups. He argues that professions are distinct from other types of vocations because of the peculiar type of activity in which they are engaged. He suggests that professions seek to restore a client's autonomy with reference to the client's particular autonomy potential and that they are responsible for a "vicarious crisis management" (or "vicarious problem solving"). In considering a therapy for a given disease, a medical doctor, for example, will have to take into consideration a patient's specific health and living situation. This requires a particular "habitus," a readiness to become aware of the particularities of unforeseen patterns as well as a readiness to intervene to the best of one's ability even in cases where available knowledge provides no answer. This

13 I am following Peter Münte's overview: Peter Münte, *Die Autonomisierung der Erfahrungswissenschaften im Kontext frühneuzeitlicher Herrschaft: Fallrekonstruktive Analysen zur Gründung der Royal Society* (Frankfurt: Humanities Online, 2004), 1:21 ff. For the different positions mentioned here, see Talcott Parsons, *The Social System* (Glencoe, IL: Free Press, 1951); Talcott Parsons, "The Professions and Social Structure," Social Forces, no. 4 (May 1939): 457–61; William J. Goode, "Community within the Community: The Professions," *American Sociological Review* 22 (1957): 194–200; Terence James Johnson, *Professions and Power* (London: Macmillan, 1972); Magali Sarfatti Larson, *The Rise of Professionalism: A Sociological Analysis* (Berkeley: Univ. of California Press, 1977).

makes the physician's relationship with a client both diffuse and specific.[14] Unlike the expert, therefore, the physician's role is not restricted to making use of available medical knowledge, and predefined checklists are useless for establishing a medical doctor's "efficiency." An evaluation of a physician's work will have to address the case-specific adequacy of intervention, which is based on a diagnosis and on a consideration of a given patient's living situation. This precludes assessment through market or administration and necessitates collegiate criticism shielded from outside (political etc.) interference. Oevermann distinguishes between three areas of professional activity that correspond to the three foci of human sociality: (1) therapy aimed at the constitution and preservation of autonomy by individuals, communities, etc.; (2) judicature aimed at the preservation of a community's normative order; and (3) science and the arts as the justification and development of knowledge. Among these three foci, science and the arts are of particular relevance because they provide the basis for the other two.[15]

In contrast to the physician's patient, of course, the "client" of science is abstract. Science and the arts represent an analytical logic that is also part

14 Regarding this observation and argument, see also Parsons, "The Professions and Social Structure."

15 For the revised theory of the professionalization, see Ulrich Oevermann, "Theoretische Skizze einer revidierten Theorie professionalisierten Handelns," in *Pädagogische Professionalität. Untersuchungen zum Typus pädagogischen Handelns*, ed. Arno Combe and Werner Helsper (Frankfurt: Suhrkamp, 1996), 70–182. For science, see Peter Münte and Ulrich Oevermann, "Die Institutionalisierung der Erfahrungswissenschaften und die Professionalisierung der Forschungspraxis im 17. Jahrhundert. Eine Fallstudie zur Gründung der Royal Society," in *Wissen und soziale Konstruktion*, ed. Claus Zittel (Berlin: Akademie Verlag, 2002), 165–230; Ulrich Oevermann, "Wissenschaft als Beruf—Die Professionalisierung wissenschaftlichen Handelns und die gegenwärtige Universitätsentwicklung," *Die Hochschule—Journal für Wissenschaft und Bildung* 14, no. 1 (2005): 307–18, Peter Münte, "Institutionalisierung der Erfahrungswissenschaften in unterschiedlichen Herrschaftskontexten. Zur Erschließung historischer Konstellationen anhand bildlicher Darstellungen," *Sozialer Sinn* 1 (2005): 3–44. For the perception of the role of science in the French context, see Andreas Franzmann, "Die Krise Frankreichs von 1870 und ihre Ausdeutung durch den Wissenschaftler Louis Pasteur—Eine Deutungsmusteranalyse," in *Wissen in der Krise*, ed. Carsten Kretschmann, Henning Pahl, and Peter Scholz (Berlin: Akademie Verlag, 2004), 117–56. For the case of art, see Ulrich Oevermann, "Für ein neues Modell von Kulturpatronage," *Die Kunst der Mächtigen und die Macht der Kunst*, ed. Ulrich Oevermann, Johannes Süßmann, and Christine Tauber (Berlin: Akademie Verlag, 2007), 13–23.

of other professions.[16] The "crisis" to be resolved here is the development and testing of the validity of cognitive and aesthetic truth claims, and the authoritative establishment of interpretations. In principle, truth claims are universal. For science, therefore, the structural equivalent to the physician's client is humanity and this includes future generations. Practically speaking, however, humanity has no political or institutional equivalent. The United Nations represents member countries and derives its legitimacy from them. It does not represent a community that would coincide with humanity. The role of "client" thus devolves to the nation-state as the most comprehensive legitimate political entity. On the basis of his study of the seventeenth-century founding of the Royal Society of London for Improving of Natural Knowledge, Peter Münte has suggested that national (or royal) academies assume the important role of legitimizing science, its radical questioning of recognized ideas, and of stabilizing investigative coherence by providing a common institutional and cognitive focus and monopoly. A nation-state, by accepting science in this particular way, acknowledges the universality and the rationality represented by the scientific discourse.[17] The revised theory of professionalization provides a foil for assessing the history of American science and of Alexander Dallas Bache's role within it.

Science as a Profession and the American Nation-State

The political context for science in nineteenth-century America differed radically from the situation in European nations. Even though the American states agreed on a Constitution in 1789, a regional and state-centered perspective carried over into the emerging federal arena. The Constitution established the idea of dual citizenship in both the individual states and in the federal state, but national citizenship was a political project rather than the social and cultural status quo. The country lacked a coherent national public and a capital city that would serve as a cultural center. In the eight-

16 For an earlier formulation of similar ideas outside of a theory of professionalization, see Alvin W. Gouldner, *The Future of Intellectuals and the Rise of the New Class: A Frame of Reference, Theses, Conjectures, Arguments, and an Historical Perspective on the Role of Intellectuals and Intelligentsia in the International Class Contest of the Modern Era* (New York: Seabury Press, 1979).

17 Münte, "Institutionalisierung der Erfahrungswissenschaften … Erschließung anhand bildlicher Darstellungen," and Münte and Oevermann, "Institutionalisierung der Erfahrungswissenschaften."

eenth century, the expansion of the settlement area in the American colonies had run counter to British interests but the United States actively pursued continental ambitions. In 1787, the Northwest Ordinance established a system of converting settled areas into territories and states, and the Louisiana Purchase in 1803 added a huge and largely unknown area to the country's settlement plans. In all of these ways, the country looked to the future rather than the past, and the prominent national perspective was not to have one. "Americans undertook their grand experiment in nation-making without a distinctive national history and culture," Peter Onuf and Leonard J. Sadosky have observed. "As republicans, who acknowledged no superior authority, they looked to each other; as provincials, who aspired to higher levels of refinement and civilization, they continued to look to the European metropolis."[18] While scholars have traditionally discussed the history of the early republic in terms of political ideology, Onuf and Sadosky have stressed that in the wake of an agreement on a formal state structure, the political basis for this structure, American nationhood, remained fragile.[19] The Civil War attests to the fact that the American states, in 1861, had not grown into a national political community, which would have made such bloodshed impossible.[20]

Historians of science have of course been aware of the infrastructural and political difficulties for the emergence of science in the United States but they have usually shared an interpretation of American politics that underemphasized the lack of a consolidated national perspective. They considered the national political framework and living conditions in the

18 Peter S. Onuf and Leonard J. Sadosky, *Jeffersonian America* (Oxford: Blackwell Publishing, 2002), 120.

19 About this earlier generation of historians, Onuf and Sadowsky write that "they focused on ideological appeal and popular response … [and] tended to underestimate the fragility of the union, and therefore the possibility of violence." Ibid., 225. See also James Roger Sharp, *American Politics in the Early Republic: The New Nation in Crisis* (New Haven: Yale Univ. Press, 1993).

20 Norman K. Risjord has pointed to difficulties in establishing coherent national symbols in the early nineteenth century because "the elimination of the monarchy meant that Americans could not look to a crown as a symbol of nationhood, and the Constitution, subject as it was to conflicting interpretations, did not serve as a valid replacement until after the Civil War. The flag … was a natural rallying point, but the makeup of stars and bars was subject to constant fluctuation with the admission of new states. The flag, which Francis Scott Key saw at dawn on September 14, 1814, contained fifteen stripes and fifteen stars, and his poem (put to the music of an English drinking song) did not become the national anthem until 1931." Norman K Risjord, *Jefferson's America, 1760–1815*, 1st ed. (Madison: Madison House, 1991), 205.

United States to be a circumstance, not an aspect intrinsic to the development of American science. If the revised theory of professionalization carries any weight in the American case, however, the development of the scientific profession in the United States requires reexamination, and with it the role of Alexander Dallas Bache.

Bache was certainly not the most innovative American scientist of his generation, but he stood out in other ways: He came from a prominent Philadelphia family that had long been affiliated with building the American national state. His maternal grandfather Alexander James Dallas was one of the instigators and leaders of the Republican-Democratic movement in Pennsylvania, and during the War of 1812, he was U.S. secretary of the treasury and, for a time, secretary of war as well. Dallas was an immigrant from England who had decided to join the emerging nation right after the Treaty of Paris had confirmed American independence in 1783. In 1805, his oldest daughter Sophia Dallas married Richard Bache, a descendant of Benjamin Franklin, an icon of American ingenuity and political independence. Alexander Dallas Bache was Sophia and Richard Bache's oldest son. His background was confirmed by his education at the United States Military Academy at West Point, then the only school founded by the federal government. None of Bache's immediate colleagues within the leadership of the American scientific community had a similar background. Joseph Henry came from more humble circumstances; Louis Agassiz, the Harvard biologist, immigrated from Switzerland in 1847; Benjamin Peirce, the Harvard mathematician, came from Cambridge, Massachusetts; William Barton Rogers, the founder of the Massachusetts Institute of Technology (MIT), had an Irish background not associated with national leadership; and so on. Bache stands out as a figure who could represent a national perspective for all areas of American culture including science. It is in line with these observations that Bache helped found the National Academy of Sciences, becoming its first president in 1863.

In this study, I will test the hypothesis that Bache's career and leadership, as well as the history of nineteenth-century American science, cannot be explained without a better understanding of the unconsolidated state of the United States as a political nation. In the absence of mature nationhood, the scientific profession could not expect to have its work confirmed by the federal government even though it required such focus and stabilization for its work. Bache's background and his role in founding the Academy suggest that prior to 1863, and in lieu of an institutional arrange-

ment, he represented science to the prospective nation and a political legitimacy for American science.

Approach and Methodology

In analyzing Alexander Dallas Bache's career, his scientific work, and his institutional objectives, I make use of a methodological approach known as objective hermeneutics.[21] While large sections of this study will be devoted to an analysis of sequences of historical decisions based on a broad sample of sources, I will occasionally switch to a detailed interpretation of individual documents such as a particular letter or speech. Even where I proceed in a more general mode, I try to contrast what was in fact done at a given time or what was in fact written in a given document with what could have been done or could have been written. This counterfactual comparison serves as a tool to go beyond a mere description of texts and events, and to identify in them conscious and unconscious motives by analyzing sequences and tracing solidified decision patterns.

The difference between decisions and the traces of decisions is crucial. It represents a basic hiatus in the social sciences (and in the humanities) between actions that are fleeting and without use in a research setting, and the traces of these actions, "texts" sufficiently permanent to become available for research. This refers to the basic notion that research requires accountability for the deduction of conclusions from evidence. The durability and availability of this evidence is a prerequisite for a methodologically controlled approach to the analysis of such evidence. The term "text" is used broadly here and taken to mean all traces of human action including letters, publications, interviews, machines, paintings, landscapes, and so on. In view of this distinction, the differences among the fields within the

21 Throughout my methodological remarks, I am drawing on Ulrich Oevermann, *Strukturprobleme supervisorischer Praxis. Eine objektiv hermeneutische Sequenzanalyse zur Überprüfung der Professionalisierungstheorie* (Frankfurt: Humanities Online, 2001), 27–42. See also Ulrich Oevermann, "Regelgeleitetes Handeln, Normativität und Lebenspraxis. Zur Konstruktionstheorie der Sozialwissenschaften," in *'Normalität' im Diskursnetz soziologischer Begriffe*, ed. Jürgen Link, Hartmut Neuendorf, and Thomas Loer (Heidelberg: Synchron, 2003), 183–219. I have sketched some of the theoretical assumptions underling this approach in Axel Jansen, "Die objektive Hermeneutik als Instrument der historischen Fallrekonstruktion," *traverse—Zeitschrift für Geschichte/Revue d'Histoire* 13, no. 2 (2006): 43–56. For a brief overview in English, see Ewald Terhart, "The Adventures of Interpretation: Approaches to Validity," *Curriculum Inquiry* 15, no. 4 (Winter 1985): 451–64.

social sciences/humanities are reduced to interpretive traditions. Such seemingly divergent fields as American studies, history, and sociology differ from the natural sciences by their common task of deciphering meaningful traces of human activity.

The analysis of such traces is possible with reference to cultural and linguistic rules. According to Ulrich Oevermann's theoretical model of "rule-governed action," autonomy manifests itself through decisions made by an individual, a community, a nation-state, a company, or any other subject ("agent", "actor" etc.), and these decisions become possible, and are indeed forced upon us, through cultural and linguistic rules. Rules come in different shapes and sizes and they have common qualities, but they are not mere agreements. Universal rules provide the means for communication across cultural borders. They enable us to identify houses and clothes in other cultures that look different from our own, and to understand, for example, that the death of a relative will be important in any culture. These universal rules are distinct from rules that are specific to a particular culture, rules that include mores and rituals that frequently provide particular answers to a universal problem.

In analyzing a given sequence of text or a sequence of events in reference to underlying rules, we can draw on what John Searle has called "Background," i.e. "a certain sort of knowledge about how the world works" and "a certain set of abilities for coping with the world." This "Background" enables us to comprehend a text because it relies on rules that are independent of it.[22] This does not mean that we are familiar with every rule and any culture and its language, traditions, etc., but we can familiarize ourselves with them because of more general, underlying rules that make translation possible. These abilities are more general than language and they enable us to understand metaphors or learn a foreign tongue. We take for granted that intention, sincerity, deception, etc. exist in any culture, as otherwise we would be going in circles.[23] Oevermann

22 This cancels out the relevance of the infamous "hermeneutic circle." Interpretation takes place with reference to rules, not through an advance understanding of a particular text, even if this interpretation will relate to a particular research question.

23 John Searle uses examples such as the following to make the point that in everyday situations we rely on all kinds of tacit expectations (Background): "If you consider the sentence 'Cut the grass!' you know that this is to be interpreted differently from 'Cut the cake!' If somebody tells me to cut the cake and I run over it with a lawnmower or they tell me to cut the grass and I rush and stab it with a knife, there is a very ordinary sense in which I did not do what I was told to do. Yet nothing in the literal meaning of those

stresses that rules provide the raw material through which autonomy becomes possible and manifests itself because rules imply "sequentiality." At any given moment, options present themselves to us, and even if we choose not to decide, we will in fact do so. We are presented with options through rules, and by selecting an option we close a branch of options while we open another. In his theoretical work, Oevermann spells out the consequences of such observations for the sociology of religion and for other areas.[24] In his methodological papers, he has developed tools for tracing decisions and their patterns and to reconstruct autonomy.

What I am trying to do in this study is to employ an approach based on these considerations both in discussing sequences of events, and in analyzing sequences of text in documents. In both cases, I will try to contrast a decision with relevant alternatives, i.e. options that were not chosen at the time. This is what I mean by "counterfactual comparison": I will make use of an unusual perspective in which I consciously introduce relevant hypothetical options to which I compare the (biographical, lexical, etc.) decisions that were in fact made. The purpose is to lay out rule-driven options that presented themselves to a historic actor, and this serves as a foil for charting the meaning of the selection that was made. In order to get a hand on the initial choices, I am consciously using a strategy of "artificial naiveté." The aim is not to paraphrase a decision or a particular piece of text but to deduce its implicit assumptions and contrast them with alternatives—not just *any* alternatives but alternatives that are relevant in the respective "text" situation. This involves asking questions such as: Given a particular family background, what does it mean to choose a certain name for one's child? Why was a particular career chosen instead of another? What difference does it make to use a particular verb instead of another verb that would also have been an appropriate choice? What is the (perhaps unconscious) objective benefit of (mistakenly) leaving out a word or

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sentences blocks those wrong interpretations. In each case we understand the verb differently, even though its literal meaning is constant, because in each case our interpretation depends on our Background abilities." John R. Searle, *The Construction of Social Reality* (New York: Free Press, 1995), 130 f. For an extrapolation of John Searle's theoretical observations and of Oevermann's theoretical and methodological work for the case of literary studies, see Lorenz Rumpf, *Naturerkenntnis und Naturerfahrung: Zur Reflexion epikureischer Theorie bei Lukrez* (München: Beck, 2003).

24 Ulrich Oevermann, "Ein Modell der Struktur von Religiosität. Zugleich ein Strukturmodell von Lebenspraxis und von sozialer Zeit," in *Biographie und Religion. Zwischen Ritual und Selbstsuche*, ed. Monika Wohlrab-Sahr (Frankfurt: Campus, 1995), 27–102.

using the wrong one?[25] The aim is to deduce implications of a given text or historic sequence in order to identify motives (related to "decision patterns") that may or may not have been conscious to the historic actor.[26]

In discussing a particular decision (such as the decision to accept a particular post, to assume a particular attitude towards the idea of a national scientific organization, or to use a particular phrase for characterizing a colleague) I will not take the validity of my hypothesis for granted but compare it to alternative explanations.[27] This allows for a repeated testing of my hypothesis. For example, I will check my analysis of Alexander Dallas Bache's early career against the results of my analysis of his educational work, which I will in turn check against the results of my analysis of his later speeches and letters. This provides both a means for identifying and testing the underlying logic of his career, and for refining its historic development and variation. The following chapters are designed as a sequence for trying out the idea that Bache's prominence in mid-nineteenth century America somehow reflects and explains the political setting of science and that the profession's support of Bache indicates that the history of science as a profession must be explained by taking seriously the unconsolidated state of the American nation.

The systematic procedure for analyzing documents and sequences of events allows for a successive testing and sharpening of the emerging in-

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25 It makes no difference whether the decision had been made consciously or unconsciously as this approach aims at the text's implicit logic rather than the author's intention. It is frequently possible to deduce the latter but it is important to distinguish it from the former. While discussing a given document or a detail from a document, I will sometimes use the present tense which reflects the presence of the evidence rather than the historic moment accessible through it. By using phrases such as "Bache infers" or "Bache implies" I do not suggest that Bache (or whoever the author of a given document may have been) was conscious of what he (or she) wrote or that he (or she) did so intentionally. Rather, the aim is to deduce the meaning of a given text regardless of whether the author was conscious of its implications.

26 In this way, this approach differs from other close-reading strategies such as the one used by Alexandre Koyré who focuses on details of the writings of scientists but does not analyze them in the way suggested here, namely, as a sequence. Alexandre Koyré, *From the Closed World to the Infinite Universe* (New York: Harper & Row, 1957).

27 This mode of investigation, an analysis through "counterfactual comparison," must not be mistaken for ignorance of available historical sources. Every effort has been made to look at all relevant material pertaining to Alexander Dallas Bache's career and motives. But for the reasons spelled out in this introduction, I will occasionally select individual documents and interpret them step by step and in detail, consciously using the interpretive strategy of "artificial naiveté" as a methodological tool for analyzing the text.

terpretation. I will use the interpretation of a given sequence as a hypothesis to be tested against an analysis of the following sequence. Falsification (in Karl Popper's sense of the term) is thus attempted both on a microscopic level of analyzing a particular document, and on a macroscopic level of testing these findings against the analysis of other documents or phases of Bache's career. The overall intent is to find specific patterns sufficiently general to explain the diversity of phenomena to which the initial question had pointed.

Investigative Agenda

For the reasons explained above, Alexander Dallas Bache will be our single "sample case." While biographical elements play a role in my analysis of this important figure in American science, this is not a comprehensive treatment of his life. The first section of this book focuses on Bache's motives for pursuing a career in science against the backdrop of a range of studies that have oscillated between a depiction of Bache as a scientist, an educator, and a manager. In chapter two, I discuss the history of both the Bache and the Dallas families that brings into focus parallels between it and Bache's own career decisions. Following a discussion of Bache's initial career choice (in chapter three), I investigate Bache's pre-Washington career that is less known and accessible than his later work. In chapters four and five, I discuss his early efforts in institution building and his educational work, respectively. These four initial chapters serve as a basis for delineating the specific advantages, abilities, and perspectives that Bache brought to a post in the federal administration in 1843. As will be seen, when Bache became superintendent of the U.S. Coast Survey, a post he would hold until his death in 1867, his program for developing science in America was settled and he laid it out in speeches he gave in 1842, 1844, and 1851.

In this second section of the book, I will slightly adjust my mode of investigation by focusing on these speeches in chapters six, seven, and eight. While I discuss individual documents in the first section of this book as well, I will concentrate on these speeches rather than historic events. In chapter nine, I continue my investigation of Bache's Washington role by analyzing a letter by mathematician Benjamin Peirce, who was a close friend and colleague, and by interpreting Bache's response. This chapter serves to illustrate the particular type of relationship fostered by Bache and

his circle of friends and colleagues—a group of influential science administrators and university-based researchers that called itself the scientific "Lazzaroni." Against the backdrop of the preceding chapters, chapter ten will provide an opportunity to test the overall thesis of Bache's interest in national consolidation against his rationale for founding the National Academy of Sciences in 1863. In chapter eleven I conclude by arguing for a new paradigm for the study of American science in the nineteenth century.

Chapter 2

Family Background

The Franklin and Bache Families

Contemporary observers as well as historians have routinely associated Alexander Dallas Bache's name with that of his great-grandfather, Benjamin Franklin. In Europe, Franklin's name evoked an image of the quintessential American, of the humble but educated and intellectually resourceful citizen, an icon of the republic in the wilderness. In the United States, his name is intimately tied to the essence of American nationhood. Such associations, however, do little to reveal the substance of Alexander Dallas Bache's family background. They provide little information about the peculiar opportunities and restrictions for Bache's way into adulthood, and the relative success and failure of his ambitions.

As an adult, Bache would certainly identify with this Franklin but what aspect of his great-grandfather's many-sided life did Bache seek to emulate?[1] Was Bache a scientist in the sense that he had come early to a fascination with exploring nature? Did he appreciate Franklin's interest in research as a means to develop applications? In view of such questions, it seems appropriate to try to comprehend Bache "from the ground up," i.e. to consider his career against the backdrop of the choices available to him in the context of his parents' and grandparents' biographical decisions, their expectations, and their social, cultural, and political milieu. Hugh R. Slotten has observed that Bache's "commitment to science as an intellectual and social activity did not exist separately from his family background, his educational experiences, and his cultural ties."[2] Beyond this obvious

1 For the relation of Franklin's scientific and political thinking, see I. Bernard Cohen, *Science and the Founding Fathers* (New York: Norton, 1995), 135–95.

2 Hugh R. Slotten, *Patronage, Practice, and the Culture of American Science: Alexander Dallas Bache and the U.S. Coast Survey* (Cambridge: Cambridge Univ. Press, 1994), 21.